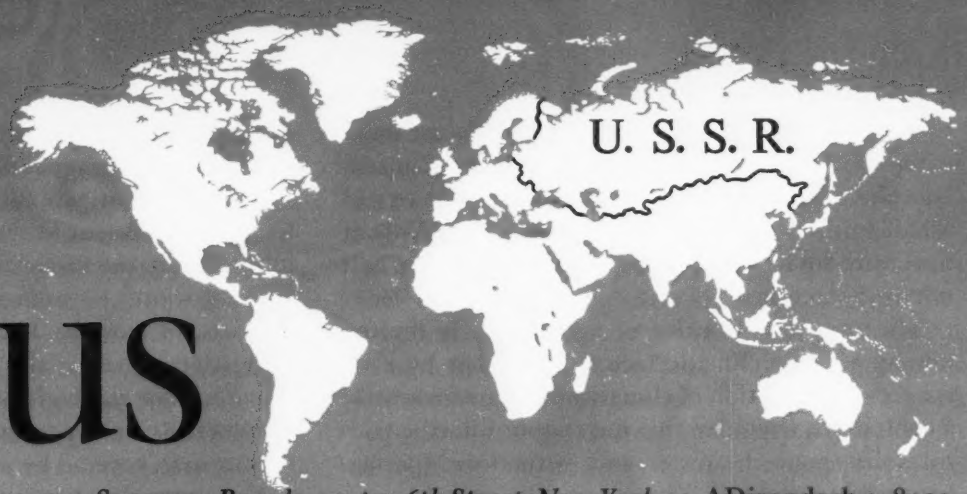

focus

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ALICE TAYLOR, EDITOR

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U.S.S.R. Resources: II—Agriculture

In contrast to rapidly expanding Soviet industry, described in a recent issue of *Focus,* Soviet agriculture has been relatively stagnant. The lack of progress in agriculture rests on two sets of factors: the harsh physical environment and the unfavorable human conditions under which farming has been carried on.

The most significant physical features limiting agriculture in the Soviet Union are directly or indirectly climatic. It is helpful to remember that the Soviet Union and North America are about equal in area (8½ million square miles) and in population (200 millions) and that in each an agricultural heartland abuts vast wastelands climatically unsuited to cultivation. In North America this heartland extends from the Atlantic Seaboard westward to about the hundredth meridian and reaches from the Gulf of Mexico northward to the southern fringe of Canada. A corresponding agricultural heartland in the Soviet Union, called the Fertile Triangle, stretches from corners at Leningrad on the Baltic Sea and Odessa on the Black Sea to somewhat east of the Ural Mountains.

These heartlands are bordered on the north by immense expanses too cool for regular farming and on the east or west sides by immense arid or semi-arid plains too dry for non-irrigated crops. But in the Soviet Union the heartland is somewhat smaller than in North America, and a smaller total area is in crops: 386 million acres as compared with 440 million (1952). Furthermore, the average crop yields in the Soviet Union fall short of those in North America. Consequently, the agricultural production of the U.S.S.R., though large in total quantity compared with that of any other individual country, remains far below that of North America.

Two critical features underlie the climatic handicaps of the Soviet Union: high latitudinal position and great longitudinal extent. Both may be perceived on the accompanying map, which compares the area and location of the Soviet Union and North America.

The Soviet Union occupies a more northerly position than North America. The fiftieth parallel lies poleward of any part of the continental United States; yet it marks approximately the southern boundary of the eastern half of the Soviet Union. The southern boundary of the western part of the Union lies at about the fortieth parallel, that is in about the latitude of Denver. Only tiny segments of the mainland of North America are north of the seventieth parallel; yet about half of the Soviet Arctic coast lies north of this latitude. As a result of its northerly location, the taiga (northern coniferous

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forests) and the bleak treeless Arctic tundra are more extensive in the U.S.S.R. than in Alaska, Canada, and Greenland; altogether such areas cover five and a half million square miles, or nearly two-thirds of the entire Soviet Union, compared with less than half of North America.

The northern frontier of agriculture is limited not by a single climatic factor, but rather by a refractory combination of climatically related features: a cool, short, irregular growing season; infertile podzol soils; poor drainage; and permafrost (permanently frozen subsoil).

The bitterly cold winters do not necessarily preclude farming but the summertime growing season is short and the weather often raw. Crop failures are frequent. The problems created by the shortness of the growing season and the moist cool weather of harvest time near the northern edge of cultivation have been solved to some extent by ancient grain-ripening kilns and by modern drying machinery on collective farms. By way of partial compensation for the short summer, however, the high latitude produces unusually long days. At the Arctic Circle the longest period of continuous daylight is, of course, 24 hours on June 21. But even at 60° north (the latitude of Leningrad, or Seward, Alaska) the period of continuous daylight is nearly 19 hours at the summer solstice.

The podzol soils of these northern areas are deficient in soluble plant foods, low in colloids, poor in structure, and highly acidic. Heavy manuring and liming are necessary to sustain agriculture; but the cost of such operations is scarcely justified in areas of low yields.

Poor drainage and bogs characterize large areas. The West Siberian lowland is the largest flat space on the face of the globe. Poor drainage there results not only from low stream gradients but also from the northward course of the rivers. Since the mouths of the rivers are frozen for longer periods than the headwaters, the downrushing spring melt waters flood widely over the level plains and linger well into the summer. In other areas, for example, near Moscow and Leningrad, poor drainage results from glacial derangement of the terrain; moraines deposited by the glaciers block many stream valleys and thus form lakes, bogs, and marshes.

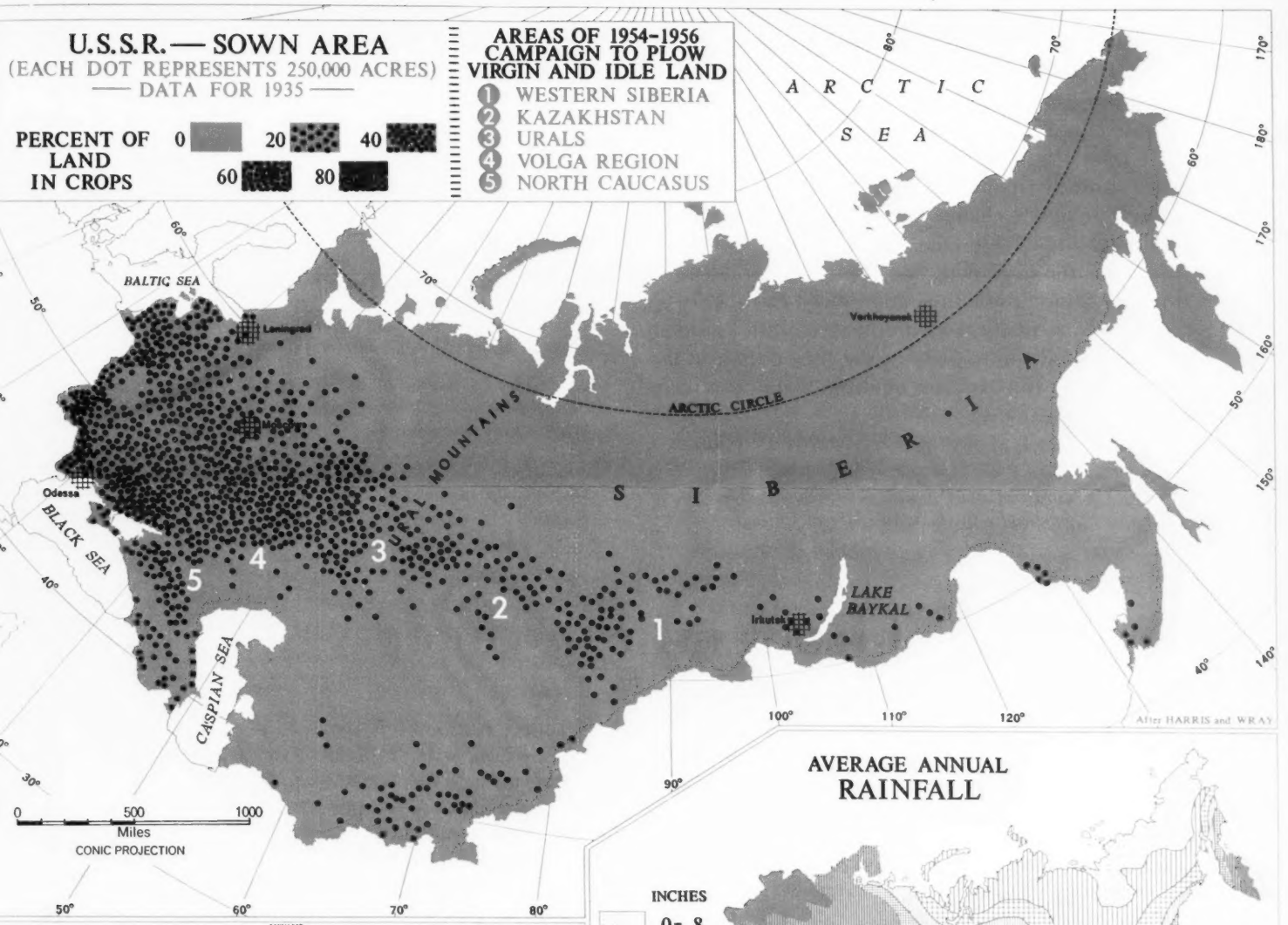
Permafrost covers nearly half of the Soviet Union. In permafrost areas only a thin surface layer thaws in summer. The impervious frozen subsoil prevents drainage, and poses difficult problems for both farming and building operations.

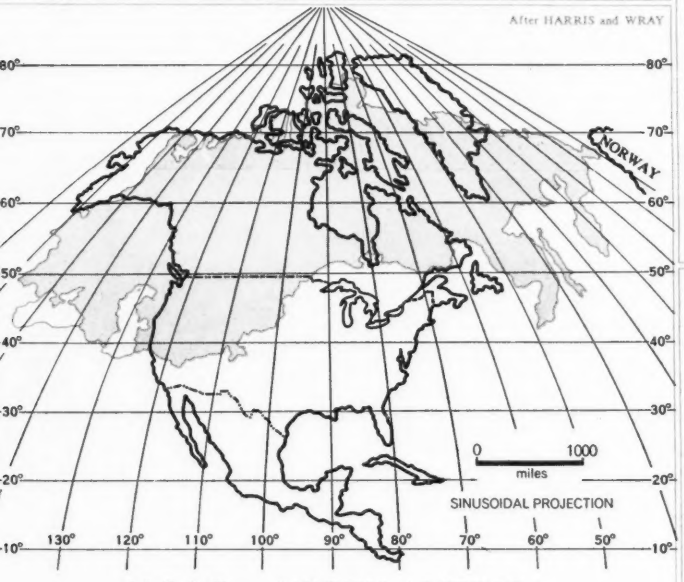
Extreme continentality results from the great longitudinal extent of the Soviet Union from 20° E. to 170° W. In the Western Hemisphere a comparable distance would be from western Alaska eastward to the coast of Norway. Because of this great east-west elongation, much of the Soviet Union is thousands of miles from any body of water that might exert an ameliorating influence on the climate (the Arctic Sea is, of course, covered by ice during most of the year).

The continentality, together with the northerly location, occasions extremes of temperature, a short growing season, and a dearth of moisture. In the eastern parts of the country the average January temperature falls to more than 40° F. below zero (-58° at Verkhoyansk). The coldness of the interior hinders the overwintering of crops or fruit trees; spring grains rather than winter grains therefore become the staple crop. Continental conditions also give rise to the relative absence of spring and fall. Winter and summer are virtually the only two seasons. Farm operations, such as planting, must be telescoped into the shortest possible period. The average frost-free season decreases eastward from 160 days at Leningrad to 130 at Moscow and only 95 at Irkutsk (near Lake Baykal). A high variability in the length of the frost-free season from year to year goes hand in hand with the dangerous risk of unseasonable late frosts in spring or early frosts in fall.

The amount of precipitation also decreases sharply eastward from the Baltic coast. Long before the winds from the west penetrate deeply into the continental interior, they have lost much of their moisture. Siberia, lacking a nearby source of moisture such as the Gulf of Mexico provides for interior North America, is prevailingly dry. Were it not so cold, it would be mostly a desert.

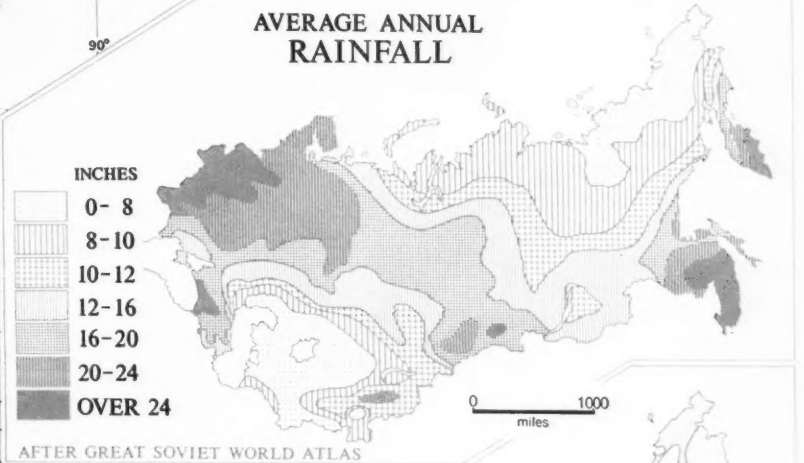
Any expansion of the agricultural frontier toward the dry southeast is risky because of the low total rainfall, the high variability from year to year, and the occasional occurrence of desiccating winds called *sukhovey*. In the continental interior, in Soviet Central Asia, about a million square miles are covered by deserts and semiarid steppes where rainfall is utterly inadequate for crops. Even in the less arid Middle and Lower Volga region, only an occasional year has enough moisture for crops; complete crop failures are frequent. The dreaded *sukhovey* may destroy within a single day a promising crop resulting from

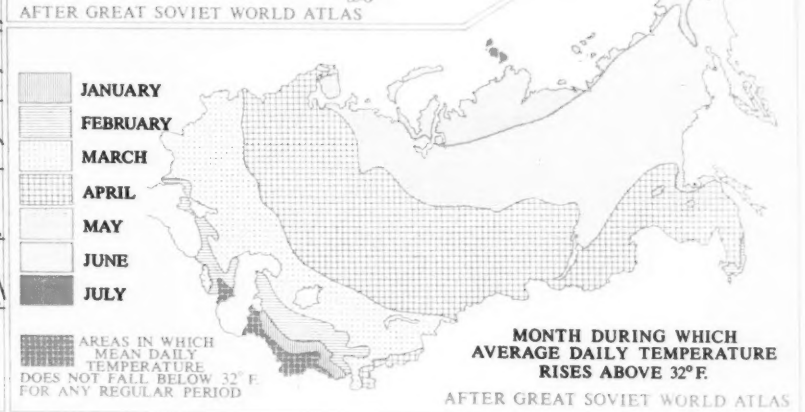




U.S.S.R.—NORTH AMERICA

A COMPARISON OF AREA AND LATITUDE





Maps drawn by Vincent Kotschar

a year of adequate rainfall; plants simply wilt, as the roots cannot supply sufficient moisture to balance the high transpiration rates caused by the blasts of hot air with very low relative humidities.

This combination of coolness and dryness deprives the Soviet Union of agricultural regions similar to the richest American ones—the Corn Belt and the Cotton Belt, both of which are favored by warm moist climates. No major Soviet region combines a long, warm growing season with adequate precipitation. Most of the warm southernmost part of the Union is plagued by an acute shortage of moisture.

The Fertile Triangle, the agricultural heartland, has a cool continental semiarid climate similar to that of the spring wheat region of the Prairie Provinces of Canada and the Dakotas of the United States. These areas are characterized by relatively low crop yields per acre, high variability of yields from year to year, a severely restricted range of crops, and little possibility of increasing yields through more intensive farming. Odessa, on the warm southern margin of the Triangle, is as far north as Duluth, Minnesota. Actually, its summer temperatures are somewhat higher than those of Duluth, being more nearly those of Omaha, Nebraska. But its annual precipitation is about ten inches less than either Duluth or Omaha. Because of the short growing season and the relatively meager and irregular rainfall, farming in the Fertile Triangle, as in the American spring wheat region, is heavily dominated by grains, mainly wheat, rye, and oats. The richest soils of the Soviet Union, the fertile chernozems (blackearths), stretch in a broad sweeping band along the semiarid southeastern edge of the Triangle, but their productivity is hampered by the scanty and uncertain rainfall.

Partly as a result of a short growing season and meager rainfall and partly as a result of poor farming methods, Soviet yields per acre are low. Estimates indicate an average wheat yield per acre of about 12 bushels (compared with 17 in the United States) and of corn of 17 bushels (compared with 40 in the United States).

The map of the sown areas depicts clearly the vastness of the noncultivated spaces in the Soviet Union. The perennial question is whether the frontiers of present cultivation cannot be pushed farther into these gigantic unfarmed expanses. The amount of cultivated land in the Union has been increasing at a moderate rate for many decades. Some tracts not now cultivated certainly could be put under the plow. A tremendous, feverish, and dangerous campaign is currently under way to cultivate 70 million acres of new semiarid land in Western Siberia, Kazakhstan, the Urals, the Volga region, and the North Caucasus during the three years 1954–1956 (see map). Although the absolute physical limits of agriculture have not been reached, the economic limits on both the cool and the dry margins doubtless have been attained or overreached in many areas. Much land now tilled is as poor as the abandoned farmland of the Appalachian Mountains or the Dust Bowl in the United States. Most of the great red areas on the map appear doomed to remain uncultivated for the foreseeable future.

While the physical conditions in the Soviet Union are relatively intractable, they alone by no means explain the sickly state of Soviet agriculture. Human factors are also important, particularly in the low yields per acre on existing farmland.

The human factors depressing agricultural production emanate especially from government policy. The government has favored heavy industry at the expense of agriculture. In order to secure funds and food to support a tempestuous upsurge in heavy industry, the government has implemented a series of oppressive tax and control devices in agriculture.

The first sweeping change effected by the government and bitterly opposed by the farmers was the collectivization of agriculture throughout the entire

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country by the combining of all farm units into giant collective and state farms. Except for small garden plots, individual peasant holdings were eliminated. Though it did not increase agricultural production, the change did provide a mechanism by which the state could collect a larger proportion of the farm output and thereby feed the urban workers engaged in the industrialization of the country. Agricultural machinery was concentrated in machine and tractor stations owned and operated by the state. Thus the government, through its control of harvesting machinery, was able to take actual physical possession of a large fraction of the total crop. At the time of collectivization farm income dropped precipitately; real farm income may not yet have recovered sufficiently to equal the pre-collectivization levels of a quarter century ago.

Hopes for increased production have been blighted by the extremely low prices paid to farmers. Much of the agricultural output has been acquired by the government at very low prices fixed by the state, only to be sold later at relatively high prices to consumers. The mark-up has been, in effect, a burdensome tax, by which the government has rapidly amassed huge sums to be invested in heavy industry. According to an official Soviet report in 1953, farm receipts on livestock farms for the entire Soviet Union average only five rubles per workday unit, equivalent in actual purchasing power to about 35 cents. A laborer on the average Soviet livestock farm must work three full days in order to make enough to purchase one dozen eggs at Moscow retail prices. That low prices have had a depressing effect on agricultural production is evidenced by the growth of the few branches of agriculture that have been granted high prices. Industrial crops, such as cotton, have been so favored.

Agricultural production generally has fallen far short of announced plans. Thus in spite of ambitious goals for rapidly increasing the number of livestock, sharp decreases have actually occurred. In the period 1928 to 1953, the number of cattle fell from 66.8 to 56.6 million (cows from 33.2 to 24.3 million) and the number of sheep and goats from 114.6 to 109.9 million (on January 1 for comparable areas). The number of hogs rose slightly from 27.7 to 28.5 million. Average milk production per cow is less than half as high as in the United States.

Recent agricultural trends in the Soviet Union contrast sharply with those in the United States. Total Soviet farm output has been sluggish for the last 25 years, while farm output in the United States has risen steeply, increasing by about 40 per cent in the last 15 years. Per capita output of edible animal products in the Soviet Union, such as meat and milk,

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